

Caregiver perceptions of a fruit and vegetable prescription programme for low-income paediatric patients

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Abstract

Objective: The physical and social environments that surround children should support good health. However, challenges with food security and access prevent many children from consuming a healthy diet, which is critical to proper growth and development. The present study sought to gain a better understanding of primary care initiatives to address these issues in a low-income setting.

Design: Following the relocation of a paediatric clinic to a farmers' market building and the implementation of a fruit and vegetable prescription programme, researchers conducted thirty-two semi-structured interviews with caregivers. Researchers elicited caregivers' perceptions of clinic co-location with the farmers' market; experiences with the prescription programme; opinions of the farmers' market; and perceived impact on child consumption of fresh produce. Interview recordings were transcribed for textual analysis. Using thematic analysis, researchers examined qualitative data to identify patterns across transcripts and formulate emerging themes. Researchers concluded when data saturation was reached.

Setting: Flint, Michigan, USA.

Subjects: The majority of participants were female (91%) and African American (53%).

Results: Four recurrent themes emerged during interviews: (i) convenience of relocation; (ii) attitude towards prescription programme; (iii) challenges with implementation; and (iv) perceived impact of combined interventions. Caregivers indicated that the co-location and prescription programme increased family shopping at the farmers' market, improved access to high-quality produce and improved food security.

Conclusions: A fruit and vegetable prescription programme involving a partnership between a farmers' market and paediatric clinic was perceived as effective in improving food security, food access and child consumption of fresh fruits and vegetables.

Keywords
Food access
Food security
Children
Farmers' market
Prescription
Nutrition incentives
Fruits and vegetables

The nutrients in fruits and vegetables are critical for proper growth and development^(1–3), cognitive function⁽⁴⁾ and chronic disease prevention^(5–9). Unfortunately, children living in the USA consume fewer servings than recommended, particularly those living in low-income households^(10–12). With fruit and vegetable intake tracking from childhood to adulthood^(11,13), it is important that health-care professionals guide children towards healthy eating early. However,

challenges related to fruit and vegetable access and affordability must be considered alongside nutrition education^(14,15). Innovative efforts such as farmers' market incentive programmes, designed to increase affordability of fresh produce, have demonstrated success in improving fruit and vegetable intake among adults^(16,17). More recently, health-care practices have launched fruit and vegetable prescription programmes^(18–20). Similar to medical prescriptions,

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these are written by health-care providers in exchange for fresh produce.

Thus far, few studies have examined perceptions of fruit and vegetable prescription programmes among adults^(18,19) and none have assessed experiences with programmes that target underserved children. Previous research has shown that participation in fruit and vegetable prescription programmes is associated with an increased awareness of the connection between food and health as well as improved management of chronic conditions^(18–20). However, evidence also suggests that prescription programmes targeting adults do not significantly improve the purchase and consumption of fresh produce^(18,19). To gain a better understanding of how farmers' market fruit and vegetable prescription programmes impact consumption patterns, particularly among low-income families, an investigation of participant experiences in these programmes is necessary. The current study sought to explore caregiver perceptions of an urban paediatric clinic co-locating with a farmers' market, experiences with a fruit and vegetable prescription programme and perceived impact of these initiatives on child consumption of fruits and vegetables.

Methods

Study setting

Approximately 60% of children in Flint, Michigan, USA are living in poverty⁽²¹⁾ and a limited number of full-service grocery stores operate within city limits⁽²²⁾. Lacking resources and nutritional options, many children experience the double burden of insufficient intake of nutrient-dense foods coupled with high intake of poor-quality, energy-dense foods. In addition to the enduring issues related to food access, the city is currently experiencing a public health crisis with Pb contamination of the water supply, which is aggravated by poor nutrition^(23–27). In August 2015, Hurley Children's Center (HCC), a Michigan State University-affiliated residency training paediatric clinic with over 11 000 visits each year, relocated to the second floor of the downtown Flint Farmers' Market (FFM). The FFM is a year-round market with over fifty vendors located inside and outside the farmers' market building. Vendors are primarily local farmers who sell fresh produce, but the FFM also offers a meat market, poultry, breads and baked goods, cheese and several restaurants. The market is open to the public on Tuesday, Thursday and Saturday.

Immediately following the ground-breaking and unprecedented move of HCC to the FFM, the two organizations partnered to establish a farmers' market fruit and vegetable prescription programme. The prescription programme began as a pilot with support from Michigan Department of Health and Human Services, and is currently funded by Rite Aid Foundation. Similar to medical prescriptions, the fruit and vegetable prescriptions are written by physicians and given to patients. All HCC

patients receive a \$US 10 fruit and vegetable prescription at every clinic visit to be redeemed for fresh produce at the FFM. Vendors treat the prescriptions as gift certificates or vouchers that can only be redeemed for fresh fruits and vegetables. The vendors stamp prescriptions as redeemed and submit the redeemed prescriptions to the FFM management office, which then pays the vendors for the redeemed prescriptions. When the FFM is closed, families have the option of receiving either the \$US 10 prescription or a vendor-prepared bag of fresh fruits and vegetables.

Approach and theoretical framework

Given the specific interest in understanding caregiver experiences with clinic relocation and the prescription programme, a qualitative approach was deemed appropriate. Qualitative research seeks to understand and interpret personal experiences, give voices to those who are rarely heard and provide rich descriptions of complex phenomena (including those related to health)^(28–30). The current study was researched with narrative qualitative methodology, which is primarily used to investigate and appropriately account for a particular experience of a designated population⁽³¹⁾. Narrative inquiry allowed researchers to use field text, in the form of interviews, to understand the narration of individuals and their experiences with the initiatives⁽³¹⁾.

The design and approach of the study were grounded in the theoretical framework of Bandura's Social Cognitive Theory^(32,33). Social Cognitive Theory describes behaviour change as an interaction between personal, behavioural and environmental factors⁽³⁴⁾. Collaborating with physicians at HCC and agricultural leaders and advocates, the framework of Social Cognitive Theory supported a sub-focus on environmental change. Since children are generally guided by parents in their dietary intake, environmental factors, such as access to healthy foods and caregiver modelling, were of critical importance^(35–38). By supporting the study with the theoretical framework of Social Cognitive Theory, researchers were able to integrate the core concepts to better elucidate caregiver experiences.

Data collection

Following the qualitative narrative approach, researchers collected data via semi-structured interviews between February 2017 and April 2017. During scheduled clinic visits, researchers purposively sampled caregivers who self-reported that their child had received a fruit and vegetable prescription. Caregivers were eligible to participate if (i) their child had received at least one fruit and vegetable prescription, (ii) they completed a screening questionnaire and (iii) they spoke English. A total of 106 caregivers were eligible and provided written informed consent. These caregivers then scheduled either an in-person or telephone interview with a researcher. Researchers attempted reminder calls to all 106 caregivers, yet data collection was challenged by poor attendance at scheduled interviews, a problem exacerbated by disconnected or non-working

telephone numbers. After successfully completing thirty-two interviews, researchers terminated enrolment and data collection based on a joint conclusion that no additional concepts were being observed. According to previous research on thematic analysis, data can often reach saturation during sampling⁽³⁹⁾. Participants received a \$US 30 gift card to the FFM after completing the interviews, which varied in length from 20 to 45 min.

The research team developed an open-ended interview format to assess caregiver perceptions of HCC's relocation; experiences with the fruit and vegetable prescription programme; opinions of the FFM; impact on child consumption of fresh produce; and suggestions for improvement. Two members of the research team, trained in qualitative research methods, independently facilitated the interviews. Questions such as 'Tell me about your experiences with Hurley Children's Center's move to the Flint Farmers' Market building' invited conversation regarding the benefits and barriers of HCC co-locating with the FFM, while more involved questions such as 'How (if at all) did participation in the prescription programme impact your child's intake of fresh fruits and vegetables?' probed about experiences related to access and consumption of fresh fruits and vegetables. Researchers had the flexibility to gather additional information based on the interview guide (Table 1), which was developed using existing literature^(18,40–42), research questions and researchers' experiences with the topic and population.

Data analysis

Audio recordings from the interviews were transcribed verbatim for textual data analysis. Using a multistep coding process, guided by thematic analysis^(43–45), researchers examined data to uncover and analyse patterns across transcripts, formulating illustrative themes⁽⁴⁶⁾. First, three researchers performed an initial coding process, individually highlighting, labelling and developing potential categories for

thematic purposes. Next, they discussed the deductive themes, influenced by interview questions 5 and 6 from the semi-structured interview guide (Table 1). The theme 'perceived impact of combined interventions', and accompanying sub-themes, serves as a deductive theme. All other themes were inductive and data-driven, therefore emerging themes. Researchers eliminated less reflective themes and collapsed similar themes. Finally, two researchers selected explanatory quotations to support the final themes and sub-themes, conclusively determining an illustrative coding scheme.

Researchers received institutional review board approvals from Michigan State University and Hurley Medical Center.

Results

Among the thirty-two interview participants (mean age 36.6 (SD 11.7) years), the majority were female (91%) and African American (53%), and the mean number of children living in the household was three.

After thirty-two participants completed either an in-person ($n = 15$) or telephone ($n = 17$) interview, it was noted that no new information was forthcoming and data saturation was reached. Presented below are the findings of the following recurrent themes that emerged during interviews: (i) convenience of clinic relocation; (ii) attitude towards fruit and vegetable prescription programme; (iii) challenges with implementation; and (iv) perceived impact of combined interventions. These themes are organized in Table 2 according to associated sub-themes.

Convenience of clinic relocation

HCC's relocation was predominantly discussed with emphasis on the new level of convenience caregivers experienced. Previously, HCC was adjacent to Hurley Medical Center in Flint, away from the downtown area and central hub for transportation. Currently, it is across the street from the central bus station and nearby downtown. In terms of distance to home, bus station or the FFM, the new central location proved to be an asset (Table 2, sub-theme 1.1). Many caregivers specifically mentioned that the clinic was now within walking distance of their home, while others praised the new location in relation to accessing the bus station:

'It [clinic relocation] is perfect. It is only ten minutes from my house.' (Caucasian female, age 37 years, with four children)

'I like it better over here – it's closer and it's convenient ... because the bus station is near and I have to take them [children] on the bus.' (African-American female, aged 52 years, with two children)

Caregivers specifically discussed the convenience of the clinic co-location with a farmers' market (Table 2, sub-theme 1.2). Many indicated that they typically buy

Table 1 Semi-structured interview guide

Question
1. Tell me about your experiences with Hurley Children's Center's move to the Flint Farmers' Market building.
2. How did you first learn about the fruit and vegetable prescription programme?
3. Tell me about your experiences with the fruit and vegetable prescription programme.
4. Describe your experiences when redeeming the fruit and vegetable prescription at the Flint Farmers' Market.
5. How did participation in the prescription programme impact your ability to get fruits and vegetables?
6. How (if at all) did participation in the prescription programme impact your child's intake of fruits and vegetables?
7. What are your overall opinions of the fruit and vegetable prescription programme?
8. What kinds of nutrition programmes would you like to see offered at Hurley Children's Center or the Flint Farmers' Market?
a. What type of nutrition programmes would be most helpful to you and your family?

Table 2 Illustrative quotes for themes and sub-themes related to caregiver perceptions of a fruit and vegetable prescription programme for low-income paediatric patients, Flint, Michigan, USA

Theme	Sub-theme	Illustrative quote*
1. Convenience of clinic relocation	1.1. Central location	'It is easier, when I don't have transportation, with the bus stop ... I can just get off the bus and come across the street.' (AF,24,3C) 'I think that was a great move that they did because women with kids don't have to worry about walking up the hill no more, you know, with their kids in the winter time. They can go straight out the bus downtown at the bus station and walk across the street to the doctor's office. It's very convenient.' (AF,43,1C)
	1.2. Co-location with the FFM	'Usually, you have to go to the doctor, and you have to get your kids out for that. Then put them back in the car. Then go to the grocery store, then put them back in. Versus you get them out once, and you put them back once.' (CF,35,4C) 'I never really came to the farmers' market. This is probably my first time coming. So, with them [clinic] being right here, it works.' (AF,29,4C)
2. Attitude towards prescription programme	2.1. Caregiver appreciation	'I just think that it's a very good programme. I think that it can help a lot of people. It will help a lot of people ... I love the programme! Let me say that, I love the programme.' (AF,21,1C) 'The other doctors that we went to before didn't do anything extra ... It's not giving them a sucker when they walk out, you know what I mean?' (CF,31,2C) 'I thought it was amazing. You know, instead of promising your kids [fast food] or something from the store or junk food, you get better fruit options and vegetable options.' (CF,35,4C)
	2.2. Experience with vendors & redemption	'They [vendors] was nice and friendly. They worked with me. They knew what the prescription thing was for.' (AF,24,3C) 'They [vendors] point you in the right direction for the voucher because some people in there don't take it and others do. Sometimes they will split it for you ... [I]f they don't have what you are looking for, they will split it between two of them. They help you out quite a bit.' (CF,56,2C)
	2.3. Preference for prescription	'I like it better when they do the vouchers 'cause ... some of the stuff they have in the bag, my kids don't eat.' (AF,28,2C) 'She enjoys the farmers' market ... [S]he gets super excited and wants her appointments on the days that they are open.' (CF,32,1C)
3. Challenges with implementation	3.1. Produce bag without option of prescription	'They handed me the stuff [produce bag]. They just came in with it and was like, "Here you go, it's free." (CF,34,3C) 'They didn't offer the voucher; it was just the bag.' (CF,30,4C)
	3.2. Inconsistent distribution	'I have received a bag of fruits, I'm sorry it was just vegetables once. My oldest absolutely loved that. Every time we go back he says, "Do I get a bag?" I say, "No, I think it is hit or miss." I don't really know exactly how they do it, but he likes it.' (CF,25,2C) 'We been coming here, we been here since they opened. I don't know when it started ... [M]y sister, she has two children that come here, and she didn't know nothing about it either. I feel like we have missed out for months.' (CF,32,1C)
	3.3. Navigating the FFM	'Nothing has stopped me from going down there ... [I]t's just hard to get a babysitter for her. And if I can't, she's heavy.' (AF,27,1C)
	3.4. Assistance with food preparation skills	'Cooking shows ... cooking classes for kids would be really nice even if you had it by the schools. It would be really nice for them.' (AF,59,2C) 'I remember when I was young, I was interested in preparing, cooking ... simple, easy snack foods that the kids can put together themselves using the fresh things that they get.' (CM,37,2C)
4. Perceived impact of combined interventions	4.1. Food security	'I didn't expect it [prescription programme] to happen more than once, but then it kept happening. I kept getting them [prescriptions] ... I never expect to go home with this huge bag of vegetables and fruits, and I do sometimes. And sometimes it's a blessing because sometimes I really need it. And that's just amazing.' (AF,35,1C) 'It's difficult 'cause I got to spend cash [on fruits and vegetables], but it is what it is ... You know how some people have food stamps and stuff? I don't get those. But it will be fine. My son loves fruit, so I buy it anyways.' (AF,21,1C) 'We are homeless right now, so we are like staying with my kids' cousins. I'm glad I came here 'cause now I can go ahead, and I've got like \$50. I can just go buy a whole bunch of fruits and vegetables.' (AF,29,4C)
	4.2. Access to high-quality produce	'They [farmers' market] are always fresh. I'm not even going to mention the [grocery] stores, but some of them aren't fresh all the time. I guess you have to catch them at a certain time when they are putting the stuff out.' (AF,65,2C) 'The ability to get more fresh stuff. 'Cause you can buy it at the store, but it's really not fresh. You can tell fruits probably came in on a truck that was too cold and it bruises fast, ages fast.' (AF,59,2C) 'I really didn't shop there until they [clinic] started giving out these vouchers, and I seen that they had their fruits, and their fruits are fresher than the grocery store.' (AF,28,2C)

Table 2 *Continued*

Theme	Sub-theme	Illustrative quote*
	4.3. Positive impact on child consumption	<p>'At our last appointment, they set the [produce] bag on the bed. He [son] was sitting on the bed, and I was putting his stuff on. When I turned around to grab his shoe, he had already grabbed an apple out of the bag and was eating it ... Before then, you could barely get my son to eat fruits and vegetables.' (AF,21,1C)</p> <p>'[W]e had time to go down there 'cause we was waiting on a taxi, and I bought fruits and vegetables. I bought raspberries, I bought kiwi, I bought oranges, bananas, what else did I buy ... some strawberries. The whole time we were waiting for the taxi, the kids just snacked off the fruit. And it was cool 'cause I didn't have to spend any cash and neither is it junk food.' (AF,29,4C)</p> <p>'She can make choices and pick things out and say, "What's that? I've never see that before." Then, we can talk about it, and she can try it.' (CF,35,1C)</p>

FFM, Flint Farmers' Market.

*Quote attributions are presented as (race/ethnicity/sex,#,#C), where AF = African-American female, # = age in years, #C = number of children, CF = Caucasian female and CM = Caucasian male.

groceries with their children and are now able to save transportation time by visiting the FFM before or after clinic visits. In fact, some caregivers shared that they shopped at the FFM only because of its co-location with HCC:

'I think we come a lot extra with the doctors being here now. Where before we would have to go out of our way to go to the farmers' market. Now, it's there, it's convenient, we're in the same parking lot, we just go from this door to that door.' (Caucasian female, age 32 years, with one child)

'Well, honestly it was the first time that I have ever been to the Flint Farmers' Market, since the clinic has been in their new building. If they [clinic] weren't connected right to it, I honestly don't think I would go there.' (Caucasian female, age 28 years, with three children)

Attitude towards fruit and vegetable prescription programme

Caregivers expressed an overwhelming appreciation for the prescription programme (Table 2, sub-theme 2.1). Every caregiver had a positive view of the programme, and most discussed their deep gratitude towards paediatricians for supporting families beyond traditional medical care. Many indicated that they had limited resources and the prescriptions helped them acquire healthy food. Others were thankful that their children were offered fruits and vegetables rather than 'treats' that often follow visits to the paediatrician:

'I was surprised that they were doing that [prescriptions], and I was touched too because that shows that they are really thinking about the people that they serve. It goes beyond just taking care of us ... it feels like they genuinely care about us. So, that meant a lot. (African-American female, age 35 years, with one child)

'I just think it's great. It's great for families that are struggling and don't get to experience the farmers'

market. Because you have to have extra money to come here ... Ten dollars, that's a lot when you have nothing.' (Caucasian female, age 32 years, with one child)

As caregivers reflected on the redemption of prescriptions at the FFM, interactions with the vendors surfaced as an important aspect of the experience (Table 2, sub-theme 2.2). The majority of caregivers discussed their fondness for farmers' market vendors, both those who accepted the prescriptions and those who did not. Vendors were considered friendly and helpful, and assisted caregivers and children in receiving the appropriate amount of produce. Additionally, caregivers expressed having a seamless experience with prescription redemption:

'It was simple. I picked out what I wanted, gave it to them and whatever was left ... If I had enough for something else, they would tell me. It was a piece of cake.' (Caucasian female, age 34 years, with three children)

'They [vendors] were very friendly and very helpful. And they were very generous ... They make it easy to get fresh fruits and vegetables. He [vendor] said, "You come back, and I will treat you right." And they always do.' (African-American female, age 61 years, with one child)

Vendor-prepared produce bags were offered as an alternative to fruit and vegetable prescriptions when the FFM was closed. The majority of caregivers indicated that they preferred the prescriptions to the produce bags (Table 2, sub-theme 2.3). Caregivers discussed how prescriptions allowed children to both enjoy the farmers' market and select their own fruits and vegetables. Some even mentioned that they scheduled HCC visits based upon their preference for prescriptions:

'I'd rather do the prescription. Because sometimes stuff in the bag, it's useful, but I find it easier for me to go and do my own shopping. Let the kids do their own shopping.' (Caucasian female, age 35 years, with four children)

'When I was first bringing him [son] it was on Monday, so now I try to make his appointments on Tuesdays, so we can go straight downstairs and he can pick out his own fruits and vegetables.' (African-American female, age 53 years, with five children)

Challenges with implementation

Although caregivers had strong positive views of the prescription programme, there were a few implementation challenges. The majority of caregivers indicated that they were given a produce bag without the option of receiving a fruit and vegetable prescription when the FFM was closed (Table 2, sub-theme 3.1). When probed further, most indicated that their families consumed most or all of the bags' contents, but they much preferred the fruit and vegetable prescriptions. Although caregivers expressed a strong appreciation for the produce bags, the majority were entirely unaware they could request a fruit and vegetable prescription in lieu of the bag:

'Usually, they just come in with the bag. There has not been an either or [bag or prescription] ... usually it seems like the days the market is closed, we get the bags.' (Caucasian male, age 37 years, with two children)

'They just gave me the bag. I didn't get prescriptions this time.' (African-American female, age 29 years, with four children)

Inconsistent distribution of prescriptions and/or produce bags was another challenge to proper implementation (Table 2, sub-theme 3.2). Most caregivers indicated that the programme was very easy to comprehend. However, when asked about specifics, the majority did not know the intended frequency of distribution:

'It was just our latest doctor's visit, that was our first time [receiving a prescription]. We have been at this clinic for eighteen months, and we have only received one prescription. So, I still don't really know how it works. (Caucasian female, age 31 years, with three children)

'Actually, the girls came here last year, I do believe. I never, I didn't get no fruits and vegetables when they had their physical last year.' (African-American female, age 36 years, with five children)

Finally, some caregivers expressed frustration with navigating the FFM (Table 2, sub-theme 3.3). Although most found vendors to be helpful, some said they were not told at the clinic which vendors accepted the prescriptions. Additionally, several mothers with small children preferred grocery store shopping with carts to hold their children and centrally located food:

'A doctor told me that they were giving me a coupon for over there. And I went, and I was wondering

who took it.' (African-American female, age 59 years, with two children)

'Just really ain't had no time to go to the farmers' market 'cause my kids are so young. So, it's kind of hard to go when you got different stands to look at. When you go into the actual grocery store, everything is right there ... They only went with me one time, and they were running all around. I said it would be easier for me to go to the grocery store, so I could be in one section.' (African-American female, age 24 years, with three children)

When asked about suggestions to improve the fruit and vegetable prescription programme, many caregivers asked for assistance with food preparation (Table 2, sub-theme 3.4). Some suggested that HCC work with the FFM to develop programmes and recipes to support families in preparing the foods that they purchase with the fruit and vegetable prescriptions:

'Well, sometime you could give them [children] a seminar or a class or something on how to incorporate the fruits and vegetables. How to fix different dishes 'cause a lot of these young kids can't cook.' (African-American female, age 61 years, with one child)

'It's not just the access but teaching people how to eat healthy and how easy it could be to prepare your own meals ... so maybe something like that could be available for parents.' (Caucasian female, age 37 years, with one child)

Perceived impact of combined interventions

During the interviews, many caregivers discussed food security issues, describing continual challenges with the cost of food (Table 2, sub-theme 4.1). Some indicated that adult family members may go without food. Others who did not qualify for government assistance struggled to purchase fruits and vegetables with limited financial resources. Many caregivers indicated that the prescription programme had been extremely helpful, particularly in times of need. Some even discussed saving prescriptions until they reached a specific dollar amount:

'We struggle like hell with food. If it wasn't for the grandparents helping us out here and there, me and my husband would basically be the ones not eating every day.' (Caucasian female, age 34 years, with three children)

'When, if I run out of cash or food stamps, then I always have those [prescriptions] ... I save some of them, hold onto them for when I need them. Like I said, when I run out of food stamps and stuff like that, I can still come and get the kids fruits and stuff.' (African-American female, age 52 years, with two children)

The majority of caregivers discussed that the combined initiatives (relocation and prescription programme)

facilitated access to fresh, high-quality produce (Table 2, sub-theme 4.2). Many mentioned that grocery stores in their area carried spoiled or poor-quality fruit but consistently noted the superior quality of the FFM's produce:

'Some people ... live quite a bit away, but they still come downstairs [to the FFM] to just have some fresh fruit. You ain't gotta worry about nothing being mouldy, you ain't gotta worry about something being outdated, you know, or picked through. Because when you go down there, everything is in order. So, it's really good.' (African-American female, age 36 years, with five children)

'Most of the time in the grocery stores, the [fruits and vegetables] are bruised and bad. Almost like they need a better selection. They are much better here [farmers' market].' (African-American female, age not disclosed, with five children)

The combined initiatives allowed caregivers to provide healthier options and introduce children to a variety of fresh fruits and vegetables (Table 2, sub-theme 4.3). Many indicated that the programme had a noticeable impact on their child's fruit and vegetable intake, highlighting an increased acceptance of fresh produce. The prescriptions were especially appreciated for their ability to provide children the autonomy to choose their own fruits and vegetables. Many caregivers reported that after their first prescription, visiting the market and selecting produce with their children became a common practice that invited further discussion of growing and preparing fresh foods:

'They had a thing called a tangelo ... [S]he loved that. And she needs more of those she said. (Caucasian female, age 32 years, with one child)

'I think they understood a lot more about where fruits and vegetables come from ... [T]hey eat it all the time, but they don't understand that it comes off a plant or a tree.' (African-American female, age 59 years, with two children)

Discussion

The present study is the first to examine caregiver perceptions of a fruit and vegetable prescription programme offered at a paediatric clinic. Central to our findings was the perceived impact of the prescription programme on food security. HCC is an urban paediatric clinic that serves primarily low-income children and families. Although not surprising that families discussed ongoing challenges with food access and affordability, feedback indicated the critical importance of the prescription programme in combatting food insecurity. Many described saving prescriptions to reach a higher dollar amount, while others discussed the importance of the prescriptions when dollars or food benefits were scarce. Although food

insecurity in children has been associated with negative health outcomes^(47–49) and poor academic achievement⁽⁵⁰⁾, primary care providers often do not play an active role in addressing the underlying problem⁽⁴¹⁾. The current study suggests that primary care providers can and should address patients' food security issues in an effort to prevent associated outcomes.

In addition to food insecurity, most caregivers talked extensively about the poor quality of produce available to them. It has been well documented that low-income neighbourhoods have lower-quality food and fewer healthy food options than higher-income neighbourhoods^(51–53). Furthermore, previous studies have reported that the primary barriers to consuming fresh produce are poor-quality fresh fruits and vegetables as well as limited money available to spend on food⁽¹⁸⁾. Caregivers in the current study described local stores with spoiled or mouldy fruits, whereas the farmers' market offered a wide variety of fresh, high-quality produce. Previous research addressing food access challenges in Flint, Michigan has presented similar findings⁽⁵⁴⁾. The partnership between HCC and the FFM is one example of creative efforts that could be modelled in low-income areas to improve access to high-quality produce.

Although previous studies focused on low-income adults have found that participation in fruit and vegetable prescription programmes does not significantly change consumption or purchasing behaviour⁽¹⁸⁾, the current study suggests that caregivers perceived the prescription programme to have a significant impact on child intake of fresh produce. Caregivers discussed using the prescriptions to purchase 'new' fruits and vegetables that children had not previously tasted. Additionally, most believed that participation in the programme increased their child's consumption of fruits and vegetables because children were able to choose the items they preferred. Some even described children tasting fruits and vegetables at the farmers' market and using prescriptions to purchase the produce they liked best.

The current study supports previous research indicating that child participation in food selection and preparation is effective in improving diet quality^(55–58). Caregivers preferred prescriptions over produce bags primarily because children enjoyed selecting their own fruits and vegetables. Although no previous studies have examined a similar model of prescription distribution with children, research focused on food pantries has demonstrated that clients prefer a 'choice' food pantry, which includes client food selection, over the traditional box or bag of pre-selected items⁽⁵⁹⁾. Caregivers in the current study discussed the importance of choice when using prescriptions *v.* produce bags, indicating that prescriptions prevented food waste that often occurred when families received unwanted food in produce bags. This finding is similar to food pantry research demonstrating a perceived decrease in food waste resulting from a 'choice' food pantry⁽⁵⁹⁾. In addition,

caregivers requested that cooking classes be offered to assist families with food preparation. Many discussed challenges with preparing fresh vegetables in particular and indicated that children frequently chose fruits with their prescriptions because vegetables were less familiar and difficult to cook. This finding is particularly important as evidence consistently reports that vegetables are poorly accepted among children^(60–62) and intake fails to meet recommendations⁽⁶³⁾.

Recognizing that produce bags were provided when the FFM was closed, the current study does not support previous research indicating that limited operating hours are a barrier to farmers' market shopping^(40,64). There were only two weekdays that families could visit both HCC and the FFM. However, when probed about the limited business hours, nearly all caregivers responded that the hours were not a deterrent to farmers' market shopping. Some responded that, in an effort to share the shopping experience with their children, they now schedule HCC appointments when the FFM is open. Most of the caregivers indicated that their children enjoyed shopping at the FFM, particularly when carrying the \$US 10 prescriptions to purchase their own fruits and vegetables.

Caregivers viewed the clinic relocation positively, noting HCC's proximity to the FFM, bus station and the centre of town. Additionally, many discussed their strong appreciation towards paediatricians and staff for providing services beyond traditional medical care. Interestingly, some caregivers also discussed improvements in medical services they perceived to be related to the relocation, such as higher quality of care and quicker scheduling of sick visits. Among the major aims for improving health care is patient-centred treatment, such that health care focuses on patient preferences, needs and values – including addressing underlying social determinants of health⁽⁶⁵⁾. Initiatives such as those described in the current study may not only assist with food security and access, but also improve caregiver perceptions of the overall quality of care.

Although the fruit and vegetable prescription programme was viewed positively, caregivers discussed challenges with implementation and offered suggestions for improvement. In response to the feedback regarding implementation challenges, HCC developed marketing materials to advertise the prescription programme, qualifying vendors and distribution frequency. To address caregiver suggestions related to food preparation, HCC partnered with the FFM to develop, implement and evaluate a cooking and nutrition education class for children at the FFM. These classes, co-taught by the FFM culinary director and HCC dietitian, focus on foods that may be purchased using the fruit and vegetable prescriptions.

Limitations of the current study should be acknowledged. There may have been selection bias as feedback from families who chose not to participate may differ from those who agreed to share their experiences. The present study specifically examined caregiver experiences with

two initiatives focused on improving access, availability and affordability of fresh fruits and vegetables. The sample size was small and specific to one paediatric clinic. Therefore, results may not be generalizable to a broader population. However, fruit and vegetable prescription programmes could certainly be modelled in areas confronted with similar challenges related to access and affordability of fresh foods. Furthermore, considering the call by the global nutrition community for programmes to address the dual burden of undernutrition and obesity⁽⁶⁶⁾, as well as increasing evidence of unhealthy food practices among young people in low- and middle-income countries^(67,68), fruit and vegetable prescription programmes may be an important tool to link locally grown fruits and vegetables with health systems.

Conclusions

Because income is positively associated with fruit and vegetable consumption, low-income children may experience particular benefit from incentive programmes designed to improve overall intake⁽¹¹⁾. The current study demonstrates that partnerships between farmers' markets and primary care clinics in areas where access to fresh food is scarce are perceived as effective in improving food security, food access and consumption in relation to fruits and vegetables. Future research will examine quantitative data, in the form of prescription fill rates, dietary recall and food security assessments, to measure reported changes resulting from interventions.

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revisions. G.R., T.C. and J.L. each assisted in conceptualization of the study and the drafting and revising of the manuscript. *Ethics of human subject participation*: This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the institutional review boards of Michigan State University and Hurley Medical Center. Written informed consent was obtained from all subjects.

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